703 Laboratory Conductivity Meter

The requirements for lab measurements become stricter every day. Quality assurance and measurement documentation in accordance with GLP are a must in many areas.

With its numerous safety functions and record printouts at keystroke, the 703 Laboratory Conductivity Meter considerably simplifies this work for you.

Fullcheck®

automatically checks the device functions during power-on. Also during operation, a complete instrument check can be carried out at a single keystroke. Here, also display and keypad are checked besides the electrical characteristics.

Record printouts

With record printouts of the device self-test, the calibration, and the parameter settings, it is possible (as part of quality management to ISO 9000 and GLP) to document the operability and the regular maintenance and calibration of the meter.

Sensoface®

Sensoface® monitors the sensor and measuring equipment and provides information on sensor selection and handling. It reports clock memory loss and requests regular checks in accordance with GLP.

Calibration

Unknown cell constants can easily be determined with a standard calibration. The meter automatically takes the TC of the calibration solution into consideration, calculates the cell constant and displays it. Of course, a known cell constant can also be entered directly.

Analog output

The galvanic isolation of the recorder output prevents the measured values from being influenced by the connected peripherals. Measurement continues unimpaired.

EMC

EMC design protects the meter from electromagnetic interferences, ensuring reliable measurement results even under unfavorable conditions.
This makes the Model 703 the first laboratory conductivity meter that completely fulfills the EMC recommendations of NAMUR.

The Model 703 offers a wide range of practical features to meet the numerous requirements of everyday measuring tasks.

Automatic switchover to 4-electrode or 2-electrode operation

With the Model 703 you can use either 4-electrode or 2-electrode sensors. The measuring input is automatically switched to the appropriate operating mode.

Temperature compensation manual or automatic
Temperature compensation takes place either automatically with Pt 1000/NTC 30 kOhm temperature probes or manually.

Standard RS 232 interface
Via the standard RS 232 interface your data can be immediately processed by a computer. Even direct output to a printer is no problem.

GLP records at the press of a key
Records of the parameter setting, calibration, and device diagnostics can be output directly to a printer. This provides you with comprehensive GLP-compatible documentation at the press of a key.

Automatic adjustment of display range
The meter automatically selects the display range with the greatest possible resolution. Of course, the desired display range can also be specified manually.

Easy-to read LED display for two measured values
The large, bright LED display allows simultaneous readout of two measured values, such as conductivity and temperature. The 14-segment display can show alphanumeric characters.

Double insulation provides electrical safety in wet locations
The well-designed enclosure has proved successful in practical use. A waterproof membrane keyboard and drain grooves protect the meter from moisture. The robust, stainless steel covered enclosure resists even strong mechanical stress.

The facts

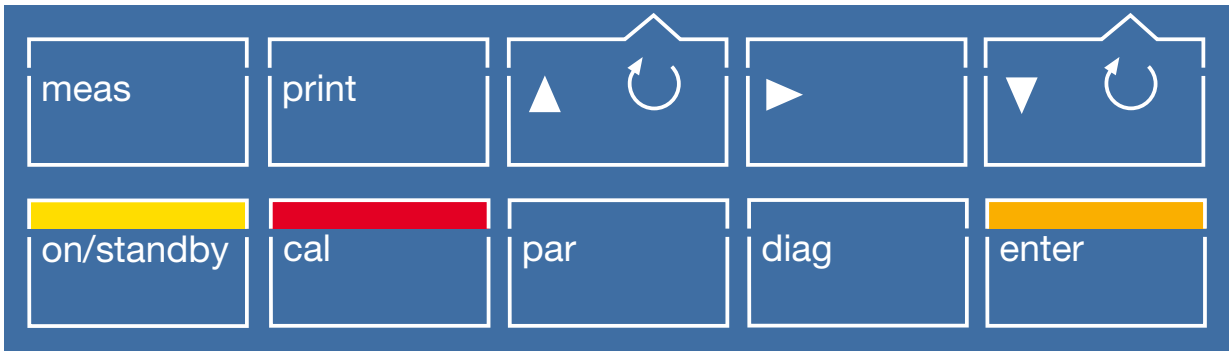
- Measurement ranges from 0.000 µS/cm to 2000 mS/cm
- < 1.000 µS/cm ... > 1000 mS/cm with one sensor
- Records for QM documentation to ISO 9000 and GLP
- Calibrated analog recorder output, galvanically isolated
- Sensoface® monitoring of sensor and measuring equipment
- Automatic calibration with standard solutions
- EMC to NAMUR
- RS 232 interface for computer and printer
- Two measured value displays, simultaneous
- Self-contained clock
- Liquid-proof membrane keypad
- Robust enclosure
- IP 54 protection
- 3-year warranty

Warranty
3 years!

Defects occurring within 3 years from delivery date shall be remedied free of charge at our plant (carriage and insurance paid by sender). Sensors and accessories: 1 year

Keypad

Exit function and return to measuring mode	Print currently measured values or function data	Select line, edit value or select variable	Select parameter or position	Select line, edit value or select variable



On/off (standby)	Activate calibration	Activate parameter setting	Activate diagnostics	Take over value or entry

Record printouts

Records of parameter setting, calibration and diagnostics are particularly helpful for QM documentation to ISO 9000 and GLP. The records can be printed out directly to any commercially available printer with serial port.


Knick 703 Calibration 19.03.03

Serial Number: 01108329
Software Version: 1.3
Hardware Version: 01
Options : No

Last Calibration: 19.03.03 10:03

Data Entry

Cell System Data
Cell Constant: 1.249/cm


Knick 703 Diagnostics 19.03.03

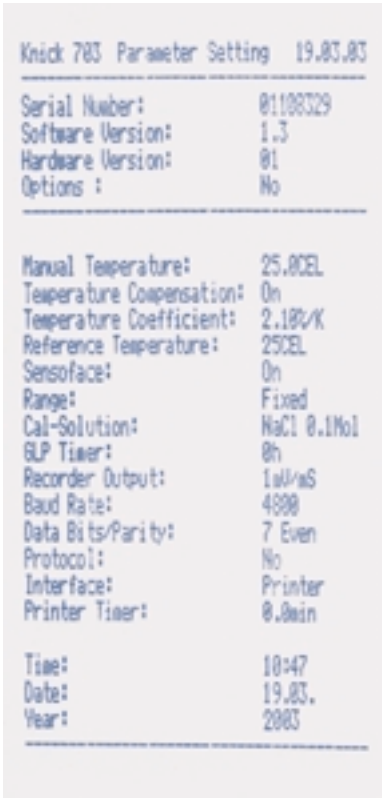
Serial Number: 01108329
Software Version: 1.3
Hardware Version: 01
Options : No

Last Fullcheck: 19.03.03 09:55

RAM: -ok-
PROM: -ok-
EEPROM: -ok-
Output: -ok-
Amplifier: -ok-
Accumulator: -ok-
Display: -tested-
Keys: -ok-

Sensoface(++/o o/--)

Cell Range: ++
TC Temperature: ++
GLP Timer: ++
Accumulator: ++
Date Check: ++


Knick 703 Parameter Setting 19.03.03

Serial Number: 01108329
Software Version: 1.3
Hardware Version: 01
Options : No

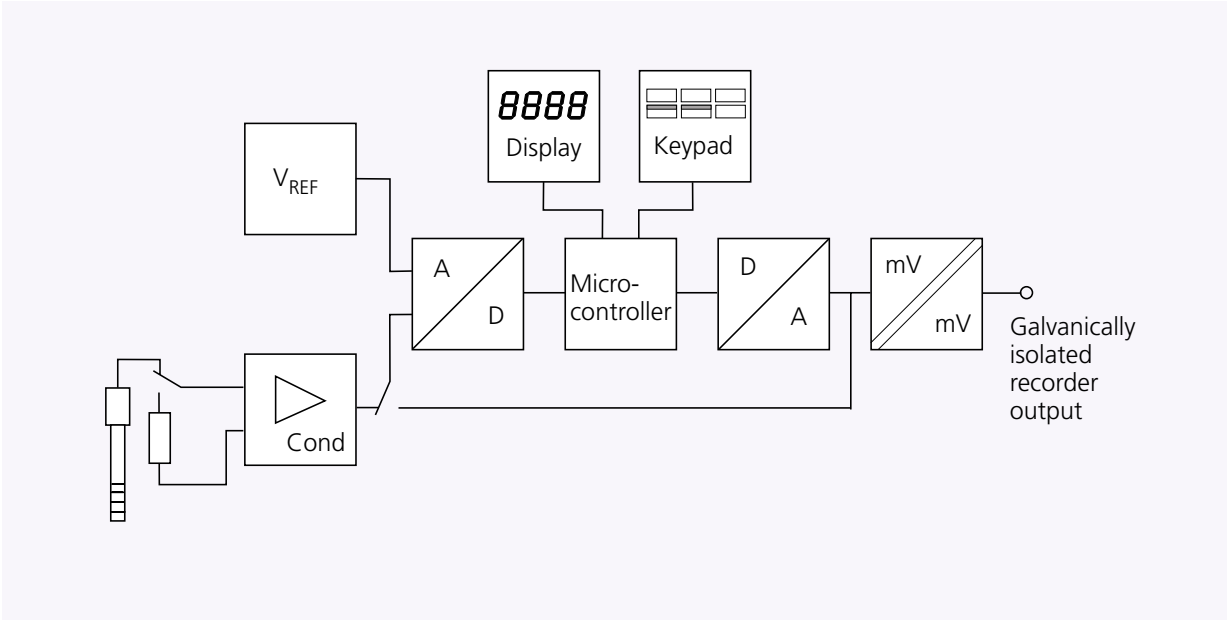
Manual Temperature: 25.0°EL
Temperature Compensation: On
Temperature Coefficient: 2.10%/K
Reference Temperature: 25°EL
Sensoface: On
Range: Fixed
Cal-Solution: NaCl 0.1Mol
GLP Timer: 0h
Recorder Output: 1mV/mS
Baud Rate: 4800
Data Bits/Parity: 7 Even
Protocol: No
Interface: Printer
Printer Timer: 0.0min

Time: 10:47
Date: 19.03.
Year: 2003

Fullcheck® device self-test

For the self test the sensor is automatically switched off and the input switched over to a reference resistor. The conductivity measuring circuit is automatically checked internally. The microcontroller sends defined voltage steps to the recorder output. These are measured with the A/D converter and compared with a highly accurate reference voltage.

This means, a complete test of the signal path is implemented with a conductivity meter for the first time. In addition, all memories, the display, and the keypad are tested.



Specifications 703 Laboratory Conductivity Meter

703 Laboratory Conductivity Meter 70

Equipment	Meter with power cord, without sensor
Ranges	Cond: 0.000 ... 9.999 µS/cm; 00.00 ... 99.99 µS/cm; 000.0 ... 999.9 µS/cm; 0.000 ... 9.999 mS/cm; 00.00 ... 99.99 mS/cm; 000.0 ... 999.9 mS/cm; 0000 ... 2000 mS/cm; auto-ranging or manual preset*); °C: –50.0 ... +150.0
Display	Alphanumer. 2 x 4-digit, 14-segment LED, character height 13 mm, measurement symbols: 20 °C, 25 °C, µS/cm, mS/cm, %/K, °C, Time, 3 Sensoface® icons inform on sensor and measuring equipment (GLP)
Measuring cycle	Approx. 1.5/sec
Measuring frequencies	Approx. 40 Hz to 2 kHz, automatic adjustment by conductance
Resolution	Up to 0.001 µS/cm
Accuracy [1)]	Cond: < 0.5 % meas. value. ±2 counts °C: 0.3 K
Reproducibility [1)]	< 0.1 % meas. val.
Temperature compensation	–50 ... +150 °C; Pt 1000/NTC 30 kOhm (autom. selection) or manual, Linear TC characteristic 0.00 ... +9.99 %/K, ref. temperature 20 °C/25 °C selectable
Adm. cell constant	0.001 ... 199.9 cm^{-1}, adjustable
Sensor standardization	Operating modes – Automatic by determining the cell constant with NaCl or KCl solution Calibration solutions: KCl 0.01 mol/l; 0.1 mol/l; 1 mol/l; NaCl 0.01 mol/l; 0.1 mol/l; saturated – Direct entry of cell constant
Monitoring of sensor and equipment (GLP)	Sensoface® provides information: – for selection of 2-electrode sensors – on too great a difference between reference and measuring temperature – for handling of 4-electrode sensors – on clock memory loss – in case of irregular checking of measuring equipment Optical display: good/average/poor
Device self-test	Test of measuring electronics including recorder output, segment and keypad test, RAM, EPROM, and EEPROM test during diagnostics, automatic short check at power-on
GLP records (ISO 9000)	Parameter settings, calibration, device diagnostics
Recorder output	Galvanically isolated (isolation voltage: 40 V DC, 20 V AC) Cond: 1 mV/µS · cm^{-1}; 1 mV/mS · cm^{-1}; °C: 10 mV/°C user-defined for printer control
Interface	RS 232 without control lines, galvanically isolated (isolation voltage: 40 V DC, 20 V AC), user-definable as printer or computer interface, Baud rate: 600/1200/2400/4800/9600*) Data bits/parity: 7/Even, 7/Odd, 8/No*) Protocol: none, XON/XOFF*) Stop bits: 1
Software	Control of the Model 703 Laboratory Conductivity Meter is integrated in the automation software for lab meters "labworldsoft" (Fisher Scientific) for display and control of device functions for Version 4.0 or higher.

Specifications 703 Laboratory Conductivity Meter, continued

Clock	Real-time clock with date, self-contained
Calibration data storage	Automatic storage of cell constant and calibration procedure with time and date stamp, self-contained
Data retention	Parameters, statistics, and factory settings: >10 years (EEPROM) Clock: reserve power >1 year (battery-backed)
Protection against electrical shock	Protective separation as defined in DIN 57100 / VDE 0100 Part 410 and DIN VDE 0106 Part 101, power supply against all other inputs and outputs, in accordance with the NAMUR recommendation "Extra-low voltage circuits with protective separation"
EMC directive	89/336/EEC
Standards	EN 61326 / VDE 0843 Part 20: 2002-3
Ambient temperature Storage and transport temp	0 ... +45 °C –20 ... +70 °C
Power supply	230 V –15 % +10 %, 48 ... 62 Hz, < 10 VA, Option 363: 115 V AC
Sensor connection	The meter allows connection of any 2-electrode sensors with banana plug. Special diode plug for 4-electrode sensors.
Enclosure	Glass-reinforced polyamide 12, stainless steel cover, IP 54 protection, prepared for connecting ZU 6954 attachable stand
Dimensions (W x H x D)	244 x 95 x 255 mm
Weight	Approx. 2 kg

*) User-defined
1) ± 1 count
2) 45 °C: factor 10
3) Good Laboratory Practice

Specifications Accessories

Printer	**Order No.: ZU 0244**
Type	Matrix printer
Interface	Serial RS 232 port
Paper	Standard paper, width: 57.5 mm (2.25 inches)
Baud rate	4800 bauds
Data bits	7, 1 stop bit
Parity	Even
Protocol	No
Power supply	230 V AC ±10 %
Dimensions (W x H x D)	197 x 73 x 153 mm
Weight	Approx. 1.2 kg (incl. power pack)

Stand	**Order No.: ZU 6954**
Material	Pillar: anodized aluminum; carriage and base: polyamide 12 glass reinforced; Beaker stop, vertical stop, and electrode clasp: stainless steel
Carriage stroke	190 mm
Clamping possibilities Stop for sample beakers	2 x 12 ± 0.5 mm; 1 x 4 ... 14 mm; 1 x 6 ... 16 mm from Ø 30 ... 150 mm
Beaker height	Up to 130 mm
Dimensions (W x H x D)	130 x 300 x 145 mm
Weight	Approx. 410 g

Plug-in power pack for immersion stirrer	**Order No.: ZU 6956**
Power supply	230 V AC –15 % +6 % < 8 VA
Cable length	2 m
Weight	Approx. 380 g

Immersion stirrer	**Order No.: ZU 6955**
Material	Enclosure: PVC; impeller and shaft: stainless steel
Dimensions	Unit: 250 x Ø 25/12 mm; impeller: Ø 12 mm; immersion depth: approx. 90 mm
Weight	Approx. 140 g

Conductivity sensors for lab and portable meters

SE 202 2-electrode sensor with integrated temperature probe (NTC 30 kOhm) and flow cell. For measurement in low-conductivity solutions such as ultrapure water and boiler feed water, e. g. for monitoring water desalination plants.
SE 204 4-electrode sensor with integrated temperature probe (NTC 30 kOhm). For measurement in natural waters such as surface water or drinking water, in aqueous solutions such as acid and alkaline solutions and for salinity determination of sea water.
With the ZU 6985 4-electrode sensor from Knick, a lab-quality universal conductivity sensor is available. The sensor operates reliably over a broad range from < 1.00 µS/cm to > 1000 mS/cm. It is equipped with a quick-reacting Pt 1000 temperature probe. It is provided with a glass/platinum measuring system with an easy-to-replace KPG® tube. It is simple to clean and requires no platinization.

Specifications Conductivity sensors

Conductivity sensors	SE 202	SE 204	ZU 6985
Number of electrodes	2	4	4
Body Electrode material	Stainless steel 1.4571 Stainless steel 1.4571	Epoxy, black Graphite	Glass Platinum, bare
Body length	120 mm	120 mm	110 mm
Body diameter	12 mm	15.3 mm	Tube 16 mm
Temperature probe	NTC (30 kOhm): –5 ... +100 °C	NTC (30 kOhm): –5 ... +100 °C	Pt 1000: –20 ... +100 °C
Immersion depth	Min.: 30 mm, max.: total length incl. Cable	Min.: 36 mm, max.: total length incl. Cable	Min. 60 mm Max. 80 mm
Pressure resistance	2 bars	2 bars	2 bars
Cell constant	0.100 cm^{-1} ±2 %	0.475 cm^{-1} ±1.5 %	1.19 cm^{-1} ±1 %
Ranges	0.01 ... 200 µS/cm	1 µS/cm ... 500 mS/cm	1 µS/cm ... 1000 mS/cm
Remarks	Incl. flow cell	–	–
Order No.	**SE 202**	**SE 204**	**ZU 6985**

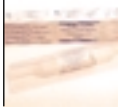
Product line Laboratory conductivity meters and conductivity sensors

		Order No.
Lab Conductivity Meter 703 	Unit with power cord, without sensor	**703**

Options

Power supply	115 V AC	**363**
2-electrode sensor 	With stainless steel body incl. flow cell (ZU 0298 adapter required)	**SE 202**
4-electrode sensor 	With epoxy body (ZU 0298 adapter required)	**SE 204**
4-electrode sensor 	With glass body	**ZU 6985**

Product line Calibration solutions, spare parts, and further accessories

		Order No.
Temperature probe 	Pt 1000	**ZU 6959**
Conductivity standard 	12.88 mS/cm ±1 % (0.1 mol/l KCl), 250 ml solution, ready for use	**ZU 6945**
	1413 µS/cm ±1 % (0.01 mol/l KCl), 250 ml solution, ready for use	**ZU 0348**
	Low conductivity 15 µS/cm ±5 %, 300 ml solution, ready for use	**ZU 0349**
	For determination and checking of cell constants, low conductivity 15 µS/cm ±5 %, 300 ml ready-to-use solution	**ZU 0350**
KPG® tube 	For ZU 6985 4-electrode sensor, incl. O-ring	**ZU 0180**
Replacement flow cell 	For SE 202 2-electrode sensor	**ZU 0284**
Adapter 	For connecting the SE 202 and SE 204 sensors to the 703 Laboratory Conductivity Meter	**ZU 0298**
Attachable stand 	Besides the immersion stirrer, the attachable stand can hold three sensors of any kind. The adjustable stops prevent damage of sensor and beaker glass. Time-consuming adjustment during sample changes has been eliminated. An integrated cable duct does away with the "spaghetti cables" on your benchtop. For ZU 6955 immersion stirrer and three sensors, directly connected to the meter.	**ZU 6954**
Immersion stirrer 	The immersion stirrer reduces sensor response time for measurement and calibration. Precision measurements to DIN 19268 even require stirring. To prevent splattering of test liquid, the stirrer automatically stops as the carriage moves up. The stirrer is supplied via the ZU 6956 plug-in power pack.	**ZU 6955**

Product line Accessories

		Order No.
Plug-in power pack 	For immersion stirrer	**ZU 6956**
Interface cable 	For meter – computer connection (special EMC cable)	**ZU 0152**
Lab printer 	With the Lab Printer, you can document your measured values either at the press of a key or timer-controlled. Also records for QM documentation to ISO 9000 and GLP can be printed out with a single keystroke. The printer is equipped with a replaceable ribbon cartridge and prints on standard paper. It is connected to the 765 Laboratory pH Meter or the 703 Laboratory Conductivity Meter via interface cable.	**ZU 0244**
Interface cable 	For meter – printer connection	**ZU 0245**
Printer paper 	For ZU 0244 Lab Printer, 5 rolls	**ZU 0249**
Ink ribbon 	For ZU 0244 Lab Printer, 5 ribbons	**ZU 0250**